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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 4 : H04M 1/54, 1/57

A1

(11) International Publication Number: WO 90/01236

(43) International Publication Date: 8 February 1990 (08.02.90)

(21) International Application Number: PCT/AU89/00152

(22) International Filing Date: 7 April 1989 (07.04.89)

(30) Priority data:
PI 9430 25 July 1988 (25.07.88) AU

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(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CM (OAPI patent), DE, DE (European patent), DK, FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.

Published
With international search report.

(54) Title: PERSONAL SIGNALLING TELEPHONE

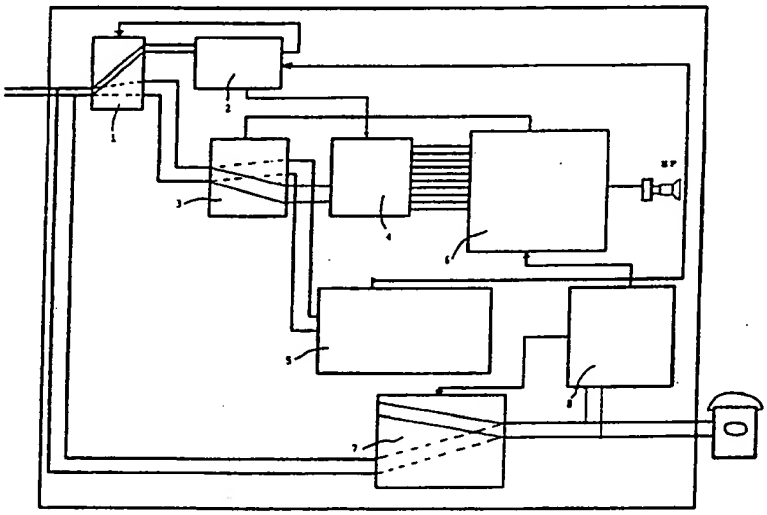

FIGURE 1 SYSTEM BLOCK DIAGRAM

(57) Abstract

A telephone or intercom circuit in which the entry of a first line number by the caller locates the desired receiving terminal and after the ring signal commences, the subsequent entry of a secondary code number by the caller initiates a distinct preselected tone at the receiving terminal which identifies the desired recipient of the call or the identity of the caller in accordance with the secondary code number. The circuit may comprise a system of three relays (1), (3) and (7) and five electronic subsystems i.e. a ring detector circuit (2), a pulse counter (4), a remote on-hook detector (5), an acoustic signal generator (6) and a local off hook detector (8).

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PERSONAL SIGNALLING TELEPHONE

This invention relates to telephone or intercom systems or the like.

With existing systems as is well known each individual station or line terminal is located by the caller entering a specific number combination. Any additional selectivity at this stage however such as the identity of a particular call recipient is not possible.

It is therefore an object of this invention to ameliorate the aforementioned disadvantages and accordingly this invention discloses an improved telephone system whereby additional information can be conveyed during the initial placing of a call by means of the entry of a secondary code number which preferably follows the line number.

Entry of the line number as with conventional systems would locate the desired terminal and once the bell commences to ring a secondary code number is then entered by the caller. This secondary number issues an instruction to perform part or all of a specific program or access a machine location, as the case requires to initiate a distinct preselected ringing sound of the received instrument. Thus the desired recipient of the call is identified in accordance with a specific and unique number entered for that terminal.

Conversely, if the line number called is used only by a limited number of recipients then each caller could be

assigned a secondary code number. Thus the initiation of a pre-selected ringing tone would be used to convey the identity of the caller.

Using this invention any telephone anywhere in the world could be used even without computerised facilities to contact a specific person. Such person moreover would become aware of the callers identity before the telephone had to be answered.

Preferably the secondary code number could be changed as required.

The currently preferred embodiment of this invention comprises an electronic unit that is connectable between a telephone subscribers line terminal and the telephone appliance. The unit preferably consists of three relays and five electronic subsystems. These are illustrated in the accompanying figures as follows:

Figure 1 shows a system block diagram of the unit,

Figure 2 is a schematic diagram of the ring detector and remote on-hook detector,

Figure 3 is a schematic diagram of the dial-pulse counter.

Figure 4 is a schematic diagram of the acoustic signal generator (block 1),

Figure 5 is a schematic diagram of the acoustic signal generator (block 2),

Figure 6 is a schematic diagram of the local off-hook detector

The operation of the unit is as follows:

In its unenergised state relay 1 connects the incoming line to the ring detector sub-system 2. When energised by an output from the ring detector the incoming line is switched to relay 3.

The ring signal is rectified by diode D1. The opto-coupler PH01 causes the input of the AND gate IC6 to go low. The output of the IC6 also goes low since opto-coupler PH02, part of the remote off-hook detection unit is unenergised due to the open circuit at relay 3. The low/high transition at the input to the counter IC4 that occurs when a ring pulse ceases causes the count to increment. After sufficient rings the output Q7 will go high, energising relay 1 and causing the incoming telephone line to be switched to relay 3. The signal RE which turns on the relay also resets the pulse counter so that it is ready to count the dialled pulses.

In its unenergised state relay 3 is connected onto a 600

ohm telephone at the input of the pulse counter 4. This simulates the handset going off-hook and thus signals the exchange to make the audio connection between subscribers. When it is energised the telephone line is connected to the remote on-hook detector 5.

If the calling party now dials a digit the received pulses are rectified by diode D2 and low pass filtered by R5 and C3 then amplified and finally are counted by IC2:A. Because there is one more pulse produced by the circuit than dialled due to the energy in the "end of dialling" spike a count of two pulses is made to signify "1" has been dialled by activating the acoustical signal for "1". The binary representation of the count at the output of IC2:A is used to drive a multiplexer, IC3 switching high one of the outputs C1 to C10. These outputs form the input to the acoustical signal generator 6.

A 555 counter generates a 10 kHz pulse stream which is input to counter IC1:A. The outputs of this counter will each represent a different acoustical signal. One of these signals is coupled via a logic network to the speaker depending upon which output of IC3 is high. Whichever acoustical signal is generated, relay 3 is energised, by combining the signals RL1 ....RL10 in IC1 to IC5 so that whichever is high the output of IC5:A is high.

When relay 3 is energised the acoustical signal is unaffected. The opto-coupler PH02 is connected across the line. Because the called party has not yet lifted the hand-

set the line is terminated by a 10K resistor in series with the photodiode. The dc voltage from the exchange turns on the output transistor of the opto-coupler, causing a low transition at the input to the counter. If the calling party abandons the call the opto-coupler output will go high causing a low-high transition at the counter input and the output at Q7 will go low, causing relay 1 to be de-energised and restoring the telephone line to the ring detect unit 2 ready for the next call. At the same time the pulse detector is reset to a count of zero inhibiting the acoustical signal.

When the handset is lifted a low impedance path is presented to the circuit through opto-coupler PH03. This turns on relay 7 which connects the handset across the telephone line allowing voice communication with the called party. At the same time SP-SW goes low inhibiting the acoustic ring signal.

When the called party hangs up relay 7 will return to its initial state once the line from the exchange goes open circuit in response to its off-hook detector 8.

As explained above, relay 7 serves to connect the handset to the telephone line once it has been answered.

As an alternative to the logic circuit disclosed in the aforementioned embodiment it is envisaged that a micro-processor could be built into the unit. This would calculate the electrical representation of the secondary code number and assign a value to it. The program would

then compare the varying input expression against the constant expressions programmed into the memory. If an assigned value match occurs an instruction is then given to initiate the appropriate part of the program which initiates the recepients or the callers identification sound.

Preferably the aforementioned programs by the use of an appropriate code number would be capable of counting the number of callers who have attempted to contact a given person over a period of time and/or the number of times a specific individual has called a particular person. Also the number of times a telephone rings without initiating the secondary code could be counted.

It may also be capable of distinguishing external and internal calls by sound.

A mechanism may also be included in the system to provide sound differentiation for each extension phone if used.

The main advantages of a telephone system according to this invention may be summarised as follows:

- Specialized or secondary code numbers can be changed as required
- The system allows more intimacy between users of the telephone.

- Operates independent of extension phones or a centralised system, and can be incorporated into existing systems.

- The recipent can choose not to answer unwanted calls.

- Contact with a desired recepient becomes more direct.

- Wasted calls are avoided.

- The system can be used to prevent crank calls.

It will thus be appreciated that this invention at least in the form described provides a novel and useful improvement to existing telephone systems. Clearly however a wide variety of other implementing circuits and hardware could be used which would be apparent to a man skilled in the art.

The claims defining the invention are as follows:

1. A telephone or intercom circuit in which entry of a first line number by the caller locates a desired receiving terminal and after the ring signal commences the subsequent entry of a secondary code number by the caller initiates a distinct pre-selected tone at the receiving terminal which identifies the desired recipient of the call or the identity of the caller.

2. The circuit as claimed in claim 1 wherein the secondary code number is readily changed.

3. The circuit as claimed in claim 2 wherein the circuit is connectable between the line terminal and the telephone or intercom appliance.

4. The circuit as claimed in claim 3 wherein said circuit is made up of sub-circuits which comprise a ring detector circuit, a pulse counter circuit, an acoustic generator circuit, a remote on-hook detector circuit and a local off-hook detector circuit.

5 A telephone or intercom circuit substantially as described herein with reference to figures 1 to 6.

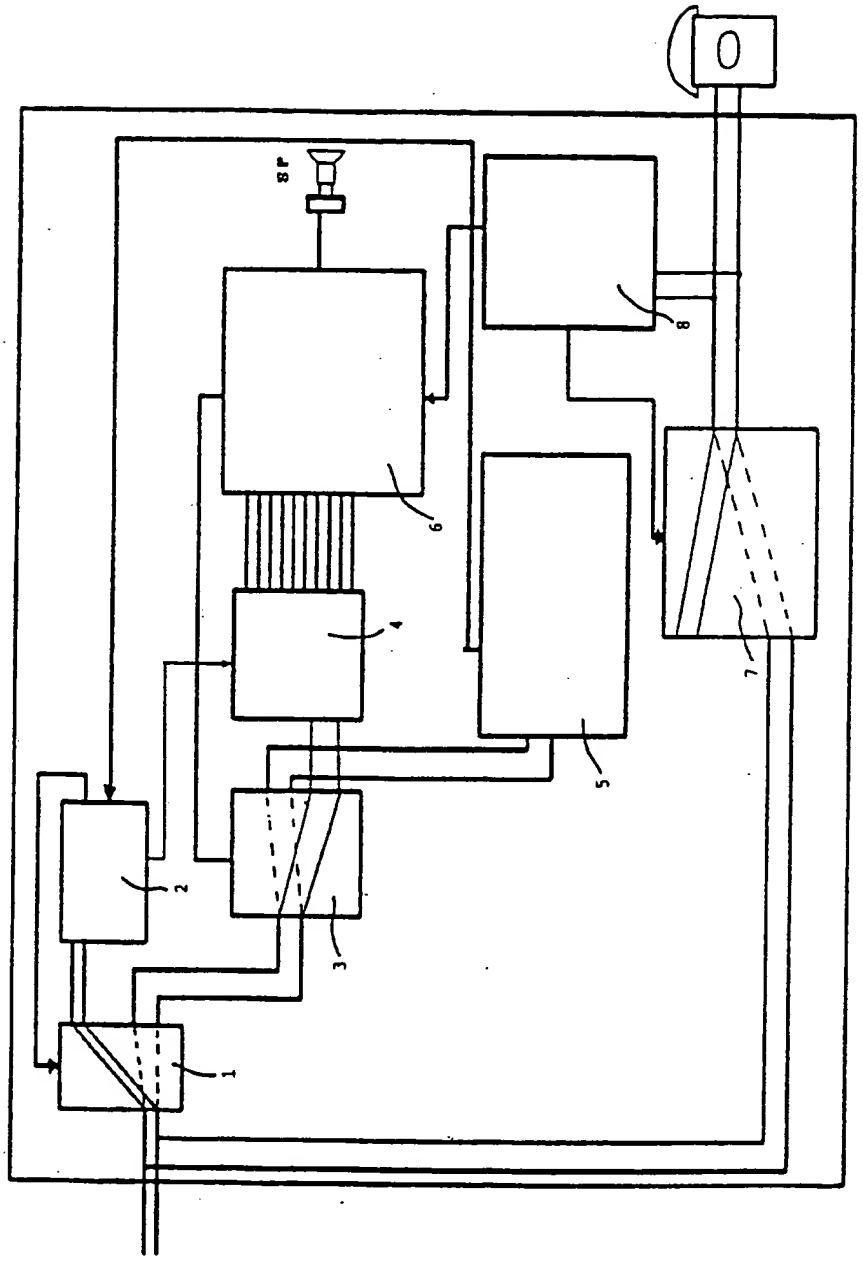

FIGURE 1 SYSTEM BLOCK DIAGRAM

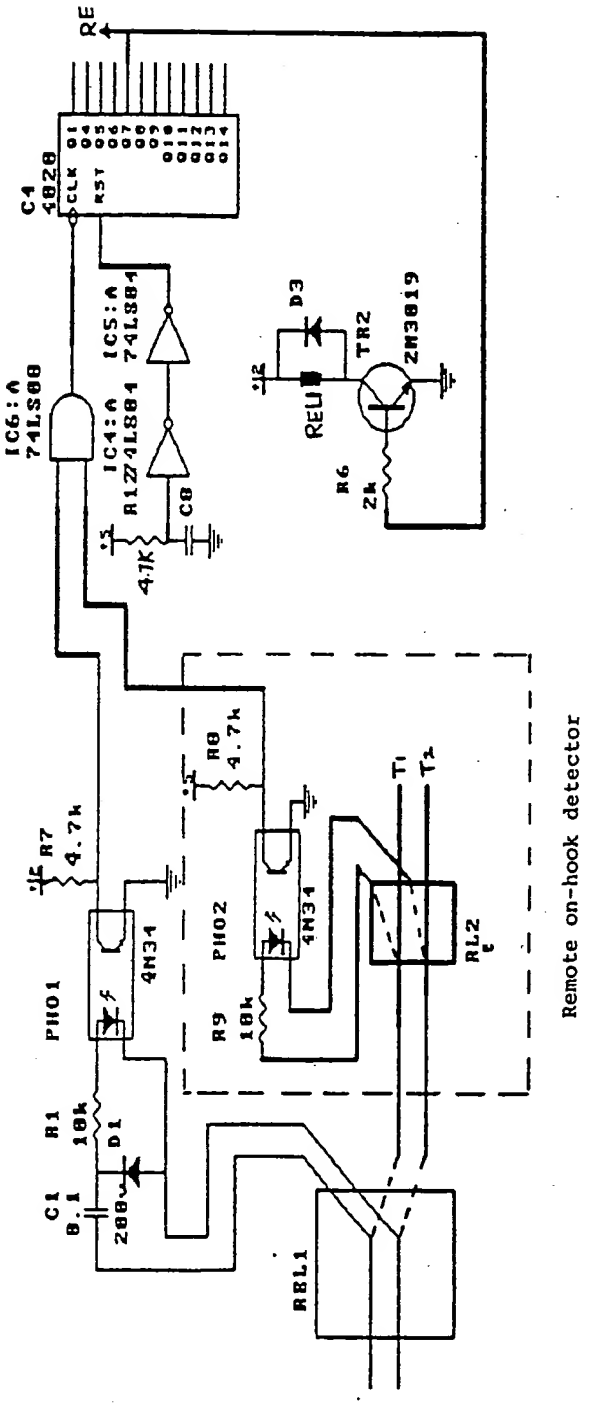

FIGURE 2 RING DETECTOR AND REMOTE ON-HOOK DETECTOR

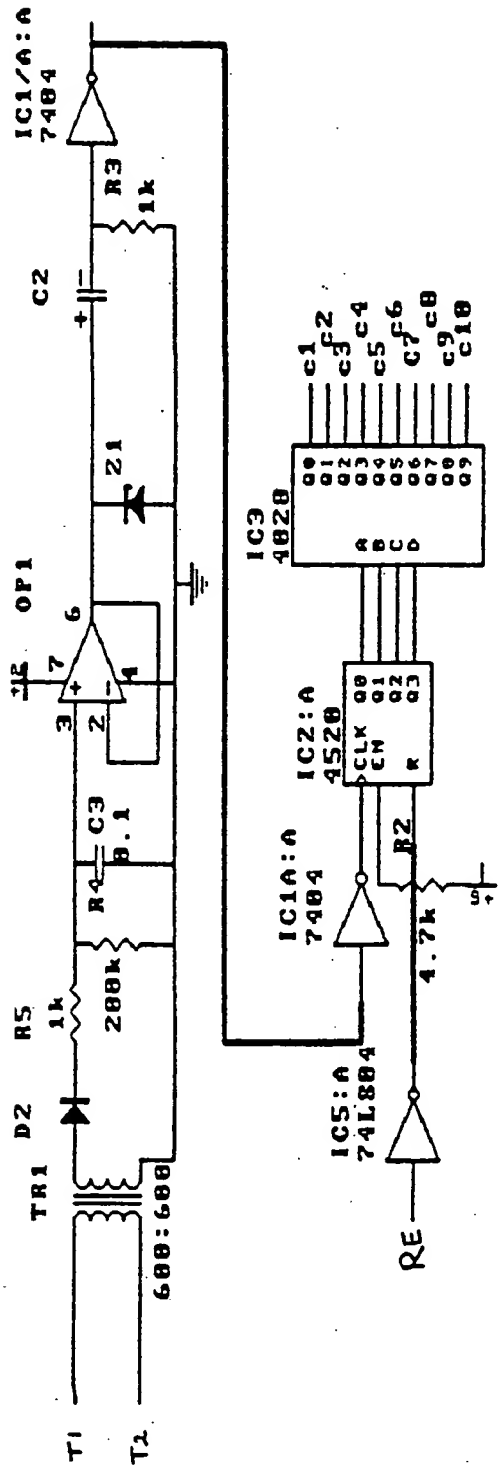

FIGURE 3 DIALPULSE COUNTER

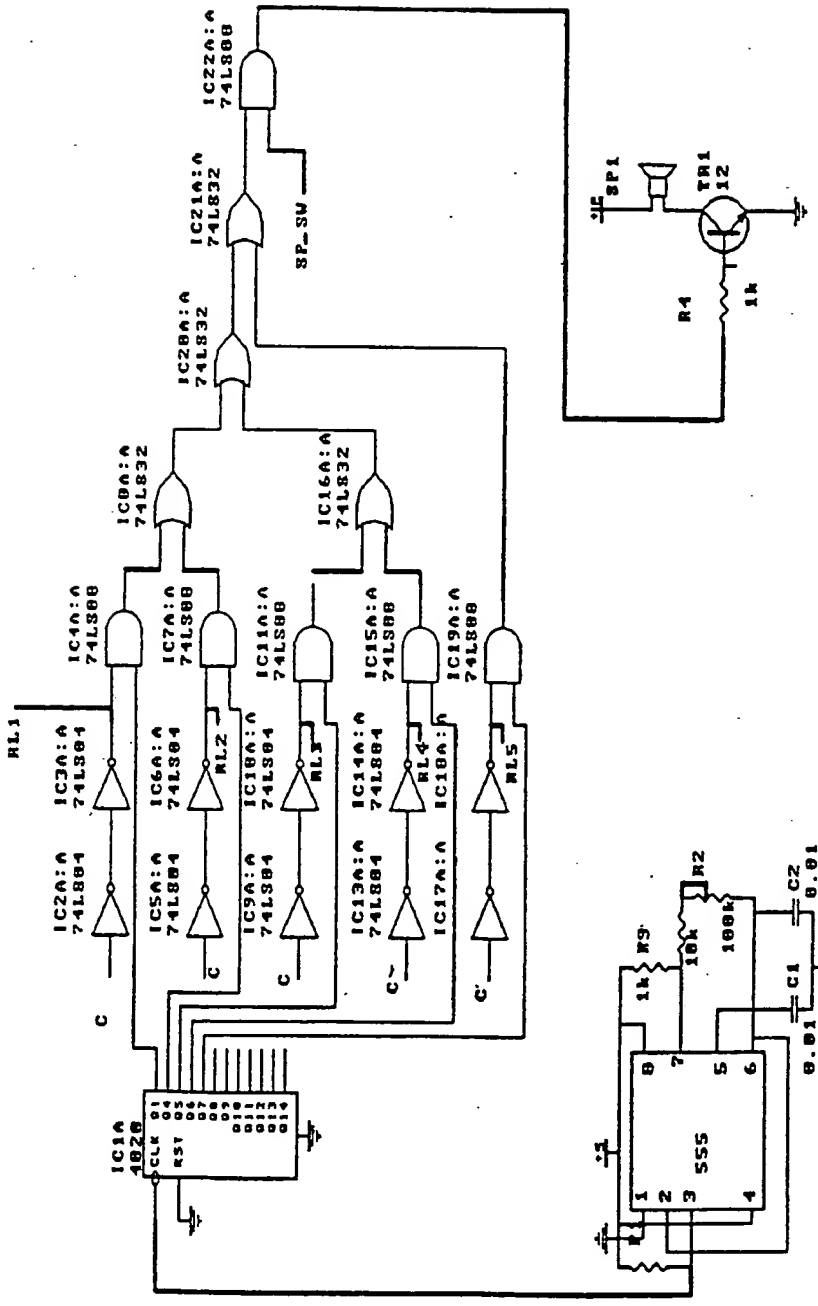

FIGURE 4 ACCOUSTICAL SIGNAL GENERATOR (BLOCK 1)

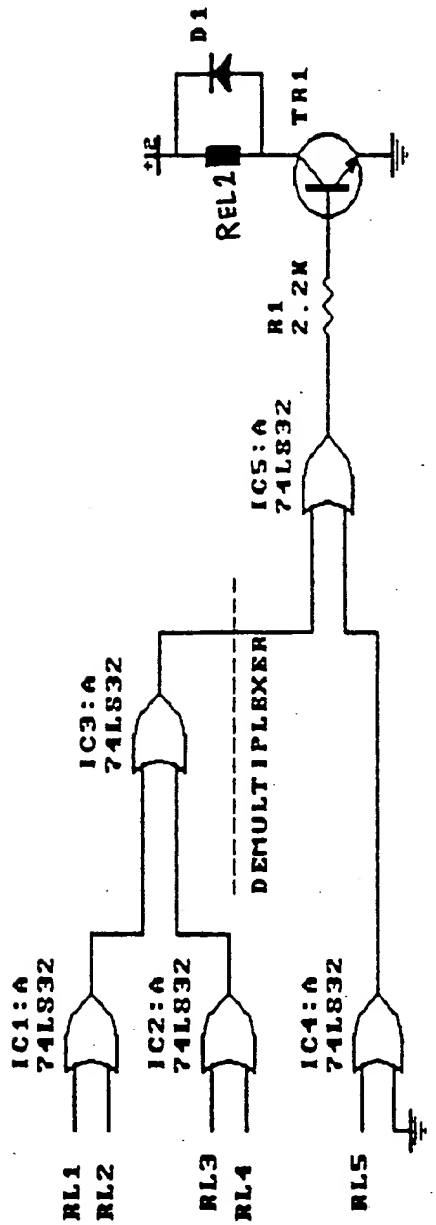

FIGURE 5 ACCOUSTICAL SIGNAL GENERATOR (BLOCK 2)

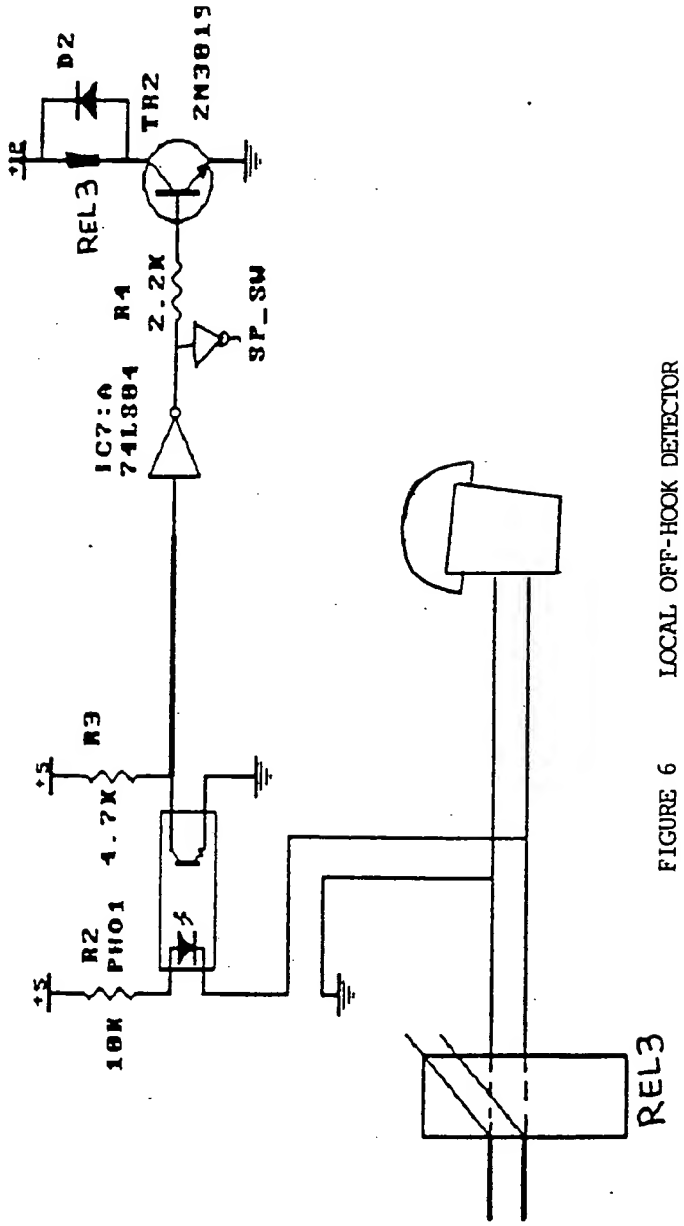

FIGURE 6 LOCAL OFF-HOOK DETECTOR

INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 89/00152

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl.[4] H04M 1/54, 1/57

II. FIELDS SEARCHED

Minimum Documentation Searched 7

Classification System	Classification Symbols
IPC	H04M 1/26, 1/54, 1/57

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8

AU:IPC as above and H04M 1/00, 1/66

III. DOCUMENTS CONSIDERED TO BE RELEVANT 9

Category*	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
X	US,A,4639552 (HALL) 27 January 1987 (27.01.87)	(1-4)
X,Y	AU,B,70627/74 (489807) (INTERNATIONAL MOBILE MACHINES CORPORATION) 8 January 1976 (08.01.76), see lines 13 to 17 of page 3.	(1-4)
Y	US,A,3514548 (DE MEO) 26 May 1970 (26.05.70)	(1-3)
Y	GB,A,2062410 (STANDARD TELEPHONES AND CABLES LIMITED) 20 May 1981 (20.05.81), see lines 81 to 91 of page 1 and lines 26 to 35 of page 2.	(1)
Y	AU,B,13009/76 (499019) (INTERNATIONAL MOBILE MACHINES CORPORATION) 20 October 1977 (20.10.77)	(1)
Y	WO,A,84/03405 (AMERICAN TELEPHONE AND TELEGRAPH COMPANY) 30 August 1984 (30.08.84)	(1)
Y	Patents Abstracts of Japan, E-507, page 57, JP,A,61-288541 (NIPPON TELEGRAPH & TELEPHONE CORP) 18 December 1986 (18.12.86)	(1)
Y	Patents Abstracts of Japan, E-683, page 81, JP,A,63-169152 (DEETANETSUTO K.K.) 13 July 1988 (13.07.88)	(1)

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
28 June 1989 (28.06.89)	3 July 1989
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Australian Patent Office	E N PERRIS